24020515

QP CODE: 24020515

Reg No : .....

Name : .....

B.Sc/BCA DEGREE (CBCS) REGULAR / IMPROVEMENT / REAPPEARANCE EXAMINATIONS, MAY 2024

Second Semester

Complementary Course - MM2CMT03 - MATHEMATICS - DISCRETE MATHEMATICS (II)

(Common for B.Sc Computer Science Model III, B.Sc Cyber Forensic Model III, Bachelor of Computer Applications)

2017 ADMISSION ONWARDS

5D4D631A

Time: 3 Hours Max. Marks : 80

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Part A

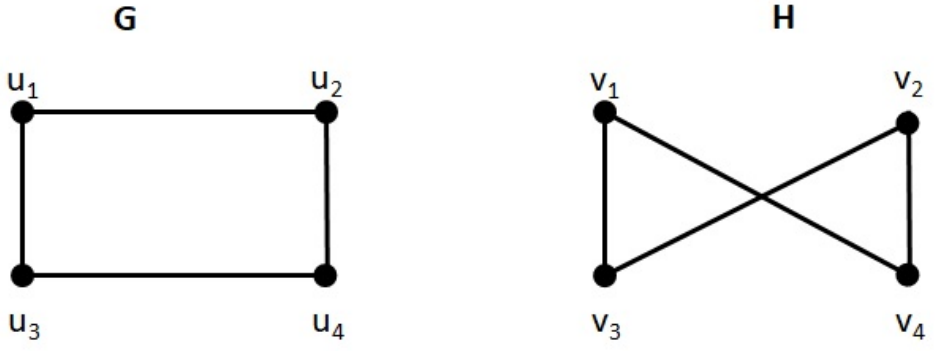
*Answer any **ten** questions.*

*Each question carries **2** marks.*

1. Define a pseudograph. Give an example.
2. Define degree of a vertex in an undirected graph with example.
3. Draw a graph with the adjacency matrix

$$\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}$$

4. Show that the following graphs G and H are isomorphic



5. Define an Euler circuit in a graph.

6. Draw a rooted tree and mention the vertiices at different levels .

7. What are Associative laws ?

8. Use a table to represent to express the value of the Boolean function F (x , y) = $\bar{x}y$.

9. Define skew hermitian matrix.

10. What is the rank of the matrix given below.
$\begin{pmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{pmatrix}$

11. What is the rank of the matrix $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 0 \end{pmatrix}$.

12. Define characteristic vector of a matrix.

(10×2=20)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. There is a simple path between every pair of distinct vertices of a connected undirected graph. prove.

14. What do you mean by a Binary tree ? Draw a Binary tree and also draw its left subtree and right subtree of the root .

15. Explain the construction of Binary search tree using a proper example .

16. What do you mean by Prefix form of an expression ? Find the value of Prefix expression
+ - * 2 3 5 / ^ 2 3 4 .

17. Prove that a simple graph is connected if and only if it has a spanning tree .

18. Use a table to express the following boolean functions .
1) F (x , y , z) = $\bar{x}y + \bar{y}z$
2) F (x , y , z) = $(x + y)\bar{z}$

19. Construct the table and circuit of Half adder to represent x + y .

20. Find the rank of matrix $\begin{pmatrix} 5 & 0 & -2 \\ 1 & 4 & 6 \\ 5 & -3 & 7 \end{pmatrix}$ by row canonical form.

21. Find the inverse of the matrix $\begin{pmatrix} 2 & 5 \\ 7 & 8 \end{pmatrix}$ using Cayley Hamilton theorem.

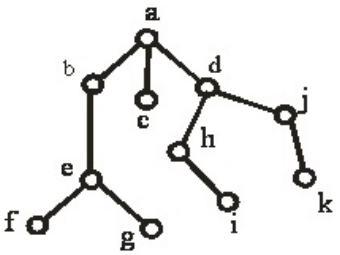
(6×5=30)

Part C

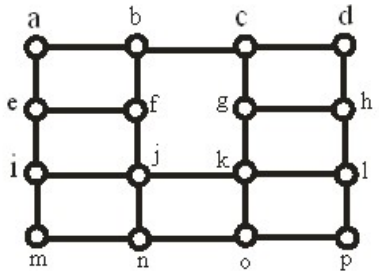
*Answer any **two** questions.*

*Each question carries **15** marks.*

22. (a) Explain pre order and post order traversal algorethms.
(b) Find pre order and post order search of the following rooted tree.



23. (a) Explain BFS spanning tree of a connected graph.
(b) Find BFS spanning tree of the following graph starting from the vertex ' a ' by explaining steps.



24. Explain Cramer's rule with the help of an example.

25. Solve the following using augmented matrix.
$a + 4b - 3c + 7d = 7$
$3a + 2b - 5c + 9d = 1$
$4a - 9b + 3c + 5d = 0$

(2×15=30)